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| **Project 2.1.4 Choosing a Problem** |

Introduction

Like the blueprints for building a house, a problem statement acts as the plan that the researcher follows as he performs the research. The problem statement must focus the separate pieces of work on the same goal. Like a blueprint, the more accurate and detailed the problem statement, the more likely the project will succeed.

The most fundamental component of a solid research project is a clear and concise problem statement. If the problem statement does not contain specific language, the researcher may go off on tangents. A solid, in-depth understanding of the research and information surrounding a specific topic will support such a statement. The ability to specifically identify and define a valid problem to be solved is a true hallmark of a successful professional in any field.

Equipment

* Engineering notebook
* Working with Experts and Mentors document
* Problem Statement Evaluation
* Problem Statement Rubric
* Problem Statement Matrix
* Patent Summary Sheet
* Research Summary Sheet
* EDD Resources
* Correspondence Log
* Effective Research document

Procedure

Your team members were brought together because you all have interest in one or more similar topics. In this activity your team will begin with those common interests and work toward formulating a problem statement that will define the problem on which you will work for the remainder of the year. Remember that you must document all work related to your design project.

1. Individually propose three problem statements for consideration. Use the Problem Statement Evaluation to improve each.
2. For each problem statement, collect three credible sources that indicate that the problem exists. Use the **Effective Research** document to evaluate each source. If you cannot find three credible sources (see **Research Summary Sheet**), then adjust the problem statement or use a different one so that the problem is at least preliminarily validated.
3. Assign a number to each problem statement. Each member of the team should individually evaluate each one. Compare notes, and as a group select a problem. Use the **Problem Statement Matrix** to help you choose among the ideas. Keep in mind that your problem statement may change or may be modified during a later stage.
4. Locate five associations, organizations, or professional societies that relate to your chosen topic area.

* Record contact information for each organization in the Contacts section of your engineering notebook.
  + Request information from each group that will help advance your research. Be sure to record the details of your correspondence in the chronological section of your engineering notebook. You may use the Correspondence Log to record the appropriate information about your contact and then insert the information into your engineering notebook.

1. Using the **Working with Experts and Mentors** document as a guide, contact at least two experts and obtain feedback on the problem statement that you are considering.
   * Record the experts’ contact information in the Contacts section of your engineering notebook.
   * Request that the experts mail information to your group. Be sure to record the details of your correspondence in the chronological section of your engineering notebook. You may use the Correspondence Log to record the appropriate information about your contact and then insert the information into your engineering notebook.
2. Find and record at least six patents that solve a problem similar to yours or that poorly solve your problem.
   * Print each patent and complete a **Patent Summary Sheet** for each.
3. As a team research at least 10 artifacts that support the validity of your problem statement and provide supporting information. To validate your problem, show that experts believe it to be a problem, consumer/users believe it to be a problem, that data supports the need for a solution, and/or that examples exist of unsuccessful attempts to solve the problem or that the attempts to solve the problem have significant flaws.
   * Document each artifact and complete a **Research Summary Sheet** for each.
4. Create a document that conveys your final problem statement. Include the most significant supporting information that you found during your research. Be sure that your problem statement answers all of the following questions:
   * Who says there is a problem?
   * What exactly is the problem?
   * Where does the problem exist?
   * When has it happened and for how long?
   * How prevalent is the problem (statistics)?

**Conclusion**

1. Describe two shortcomings of your problem statements.
2. How can one of the problems that was not chosen be altered to become a valid problem statement?